

# **WBS 6.2.1.3: BNL Hybrids Report**

Gerrit van Nieuwenhuizen  
May 12, 2016

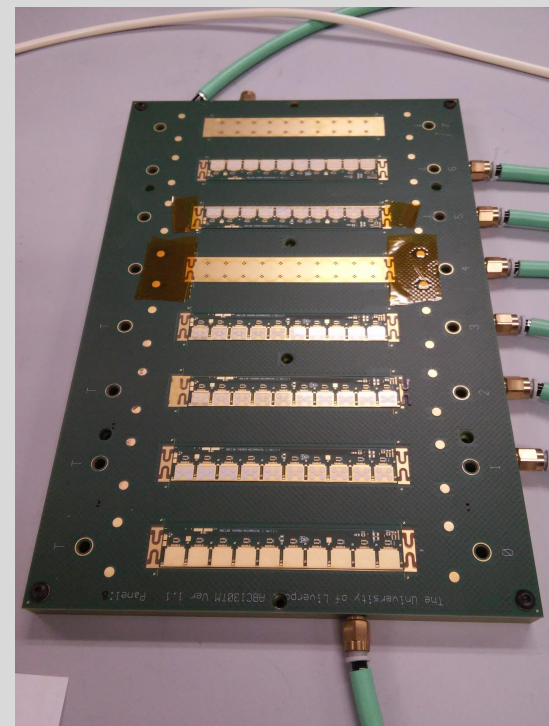
# BNL hybrid deliverables

Layer	Radius	staves per layer	# of modules	# of hybrids	# of ABC130	# of channels	m²	
1/2 barrel!	0	405	28	784	1568	15680	4,01	7,45
	1	562	40	1120	2240	22400	5,73	10,53
	2	762	56	1568	1568	15680	4,01	14,75
	3	1000	72	2016	2016	20160	5,16	18,96
Total full barrel		392	10976	14784	147840	37,85	103,43	

- 14784 + 10% (?)
- Equal split US and UK
- Equal split in US between LBNL, UCSC and BNL
- BNL will have to produce 2720 hybrids
- → 340 hybrid panels

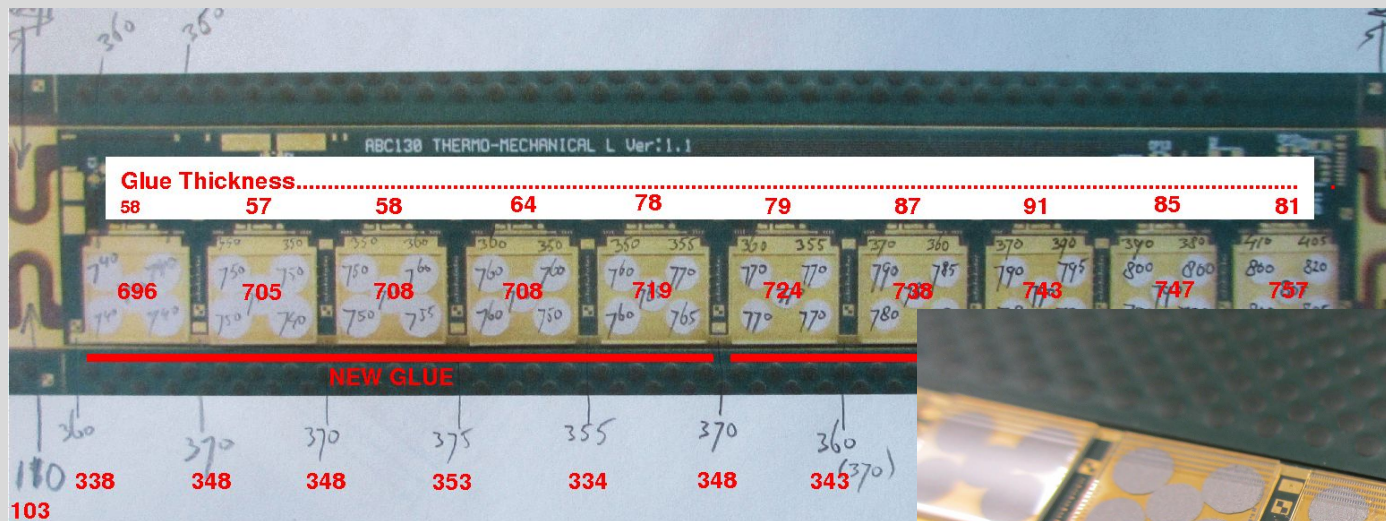
# BNL hybrid production

- 340 hybrid panels to do
- Probably can use the existing chip tooling
  - Maybe mechanically modified
  - Modified for UV cured glue
  - Use glue dispenser instead of stencils
- Need to do 5 hybrid panels per week (20 modules)
  - Can do multiple panels per day with UV curing
  - About 6400 wire bonds per panel
  - Minimum of 1 wire bond per second, 2 per second likely → 1 to 2 hours per panel
- QA? Burn in? Thermal cycling?

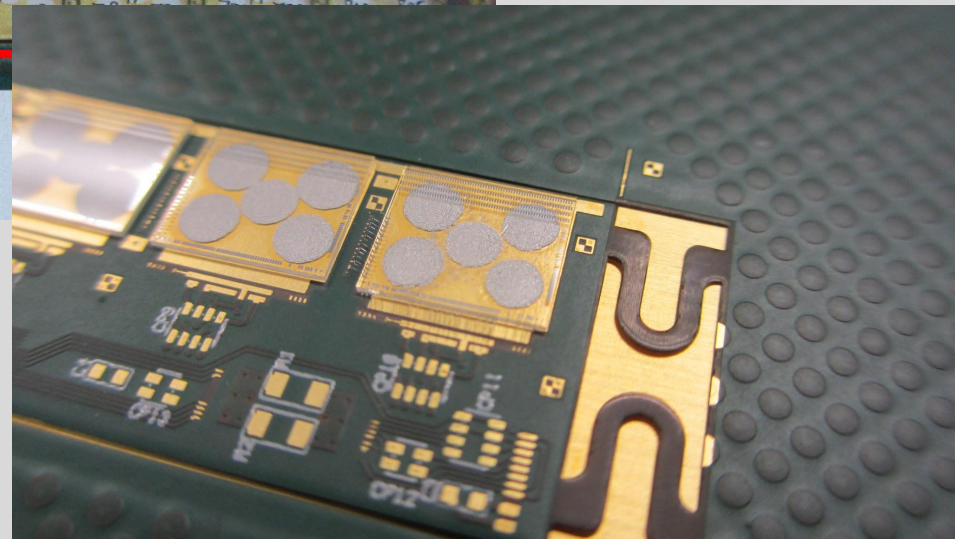


**Construction seems to be feasible, but QA could be a challenge**

# BNL hybrid gluing and bonding

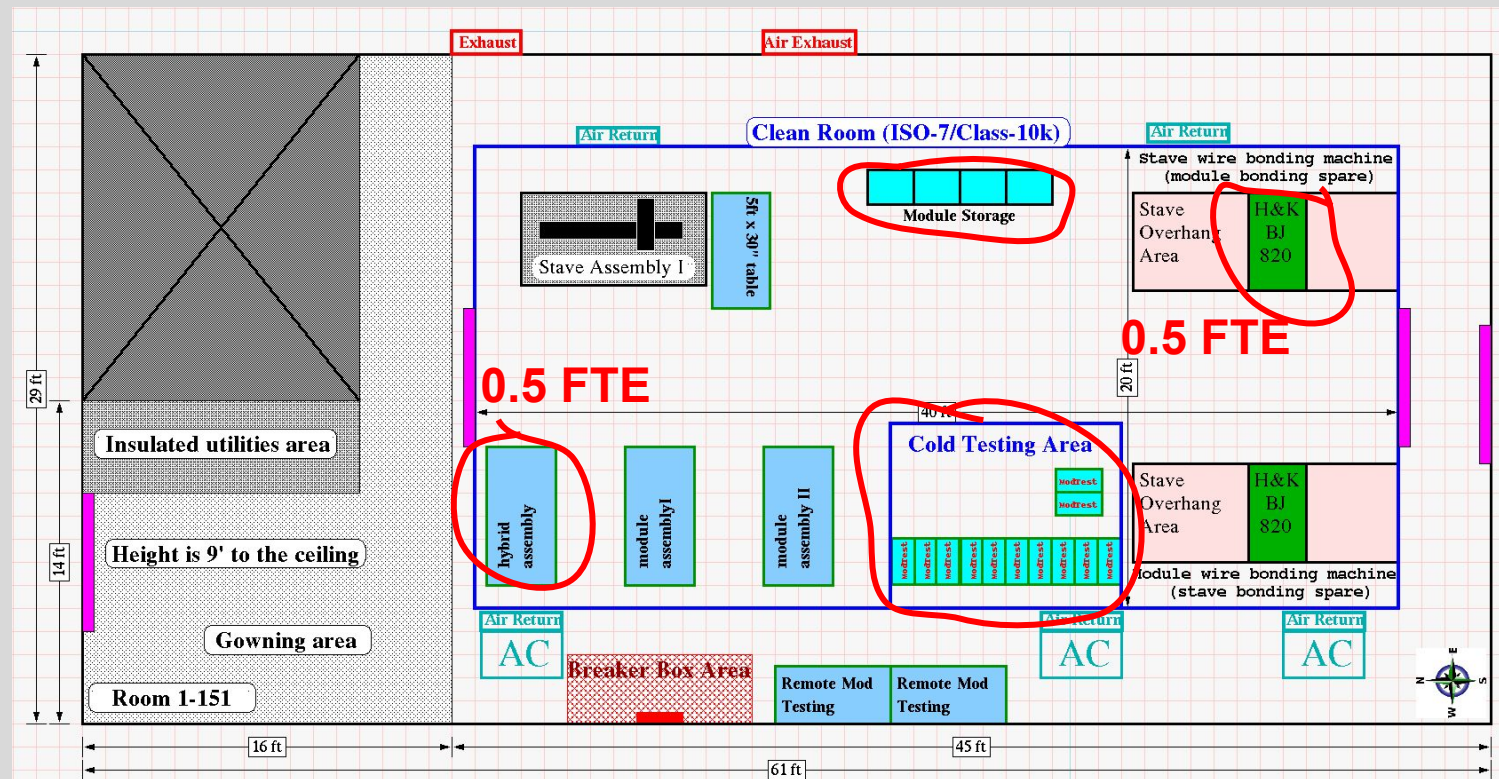


**Gluing works, but is a hassle**  
**Stencils and getting right height**  
**Bonding works**  
**Need to consolidate programs**  
**Need formal commitment Instr.**





# BNL hybrid production resources



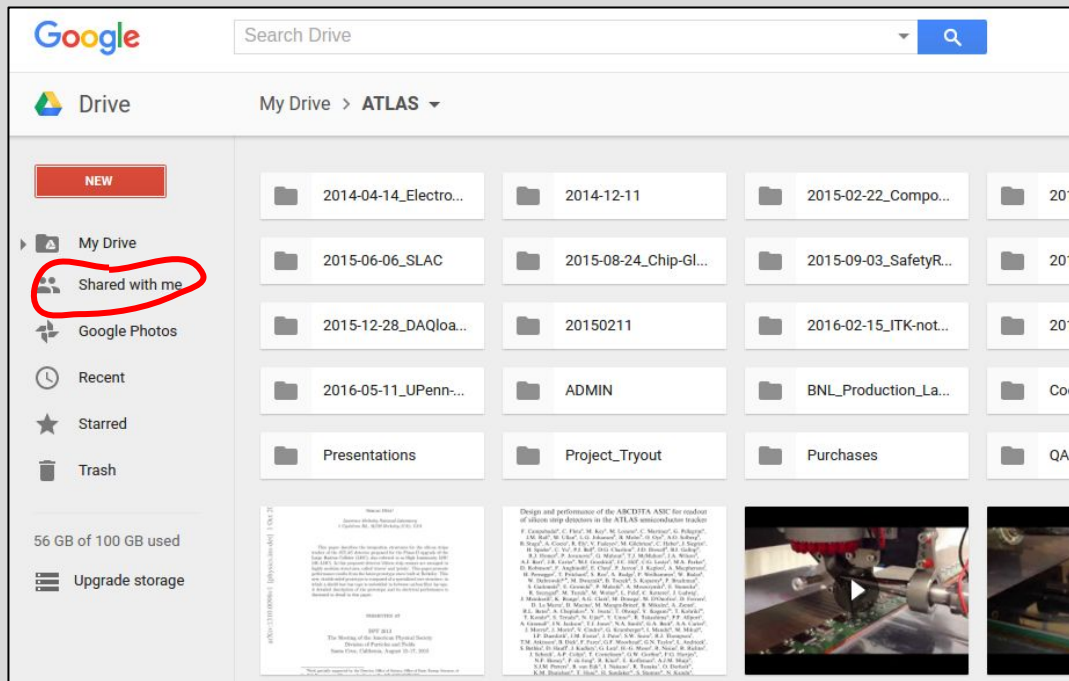
Resources will be discussed in stave assembly session

# BNL hybrid schedule

- Glue testing mostly right now
- We have material for another 3 Thermo-Mech hybrid panels
- Electrical hybrid panels should be available end of May
- When do we get electrical ABC130s and HCCs again?

# BNL hybrid management

- Alessandra is deliverable manager
- Alessandro is BNL contact person for hybrids
- Information exchange between the 3 hybrid production sites, How?



# BNL hybrids risks

- **What are the risks?**
  - **At the moment, delays → moderate schedule risk**
  - **Mitigation is mostly using thermo-mech hybrids or older electrical hybrids to keep the 'learning process' going**